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ESTIMATION OF TAX RECEIPTS FROM THE USE OF FOREST LAND IN THE CONDITIONS OF DECENTRALIZATION OF AUTHORITY

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Introduction. The financial and economic mechanism rational use and protection of land forestry should be based on realization national land relations policy, which envisages comprehensive state support for efficient use of nature through financing of appropriate organizational measures and introduction of economic instruments, incentives for rational use of forest resources. The main levers of such a mechanism are fiscal, monetary, budgetary and other elements of influence on economic entities.

Aims and tasks. To realization the delivered goal it is necessary to solve a number of tasks, namely: to determine the actual area of forest land within the respective united territorial communities in Ukraine, to determine the possible economic income from the use of these forested areas, to calculate the volumes of fiscal receipts to the budgets of united territorial communities from forestry enterprises.

Results. With the help of geoinformation approach was installed, it was established that the forest area in the united territorial communities were concentrated in Zhytomyrska (788.5 thousand ha), Chernihivska (583.6 thousand ha), Volynska (432.9 ha), Rivnenska (282, 8 thousand hectares), Sumska (216,0 thousand hectares) regions. Whereas the smallest forest area within the boundaries of the united territorial communities is concentrated in Kirovohradska, Zakarpatska, Mykolaivska, Zaporizka, Vinnytska, Donetska, Luhanska, Odeska, Khersonska regions.

Conclusions. Besides, in the case of use of forest areas within united territorial communities utility companies, they pay 18% income tax, which comes fully to the budget of the united territorial communities. We have made calculation of such fiscal receipts by areas where forestry production it is profitable. Therefore, our proposed scientific approach to the development of a financial and economic mechanism for regulating the rational use of forest land use should be based on the totality of fiscal budgetary relationships between forest resources and subjects entrepreneurial activity, which are based on the application of the geospatial approach of accounting of forest areas as an integral part of information support for the effective functioning of the economic system as a whole. On the whole, due to the proposed financial and economic mechanism, the total amount of tax revenues to united territorial communities in Ukraine can be increased by 10.2% of the actual receipts from their own resources of the united territorial communities in Ukraine for 2015 – 2016, or 6.01% of total volume taxes on individuals' income the united territorial communities in 2018. At the same time, the forest area within the united territorial communities at the national level is only 18.95% as of 2019.

Keywords: land use, financial and economic mechanism, geospatial approach, decentralization of power, taxes.

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ОЦІНКА ПОДАТКОВИХ НАДХОДЖЕНЬ ВІД ВИКОРИСТАННЯ ЛІСОВИХ ЗЕМЛЕКОРИСТУВАНЬ В УМОВАХ ДЕЦЕНТРАЛІЗАЦІЇ ВЛАДИ

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Вступ. Фінансово-економічний механізм раціонального використання та охорони земель лісогосподарського призначення повинен ґрунтуватися на реалізації національної політики у сфері земельних відносин, яка передбачає комплексну державну підтримку ефективного природокористування через фінансування відповідних організаційних заходів та впровадження економічних інструментів, стимулів раціонального використання лісових ресурсів. Важелями такого механізму є фіскально-кредитні, грошові, бюджетні та інші елементи впливу на суб'єктів господарювання.

Мета та завдання. Визначення ймовірних податкових надходжень до бюджетів громад від використання лісових землекористувань лісогосподарськими підприємствами. Для реалізації поставленої мети необхідно вирішити ряд завдань, а саме: визначити фактичні площі лісових земель в межах відповідних об'єднаних територіальних громад в Україні, визначити можливий економічний дохід від використання цих лісових площ, розрахувати обсяг фіскальних надходжень до бюджетів об'єднаних територіальних громад від лісогосподарських підприємств.

Результати. За допомогою геоінформаційного підходу нами було встановлено лісові площі в об'єднаних територіальних громад. Разом з тим у випадку використання лісових площ в межах об'єднаних територіальних громад комунальними підприємствами, які відповідно до чинного законодавства сплачують 18 % податку на прибуток підприємств комунальної власності, який у повному обсязі надходить до бюджету об'єднаних територіальних громад, був здійснений розрахунок таких фіскальних надходжень в розрізі областей де ведення лісогосподарського виробництва є прибутковим.

Висновки. Отже, запропонований нами науковий підхід щодо розроблення фінансово-економічного механізму регулювання раціонального використання лісових землекористувань, повинен ґрунтуватися на сукупності фіскально-бюджетних відносин між лісовими ресурсами та суб'єктами підприємницької діяльності, які ґрунтуються на застосуванні геопросторового підходу обліку лісових площ, як складової частини інформаційного забезпечення ефективного функціонування економічної системи в цілому. В цілому за рахунок запропонованого фінансово-економічного механізму загальна сума податкових надходжень до бюджетів об'єднаних територіальних громад в Україні може бути збільшена на 10,2 % від фактичних надходжень від власних ресурсів об'єднаних територіальних громад в Україні за 2015 – 2016 роки, або 6,01 % від загального обсягу податків на доходи фізичних осіб до бюджетів об'єднаних територіальних громад у 2018 році, при цьому лісова площа в їх межах на загальнодержавному рівні складає лише 18,95 % станом на 2019 рік.

Ключові слова: землекористування, фінансово-економічний механізм, гепросторовий підхід, децентралізація, податки.

Introduction. Modern international and national initiatives stimulate a great interest of scientists in improving the relationship between the balanced use of nature and the well-being of people on our planet. This is evidenced proclaimed in 2000 by the UN Secretary-General Kofi Annan's program «Millennium Ecosystem Assessment» (MA). Studies conducted under this program, since 2001, were concerned with assessing the consequences of changes in ecosystems on human well-being and outlining science-based management measures, needed to expansion opportunities ecosystem conservation and their sustainable use [1].

According to the results of this project, considering forest systems – land, which is dominated by trees, determined that they usually are commonly used for the production of timber, firewood and non-timber forest products. It has been found that the area of forest systems in the world has halved over the last three centuries. Forests have completely disappeared in 25 countries, and 29 more countries lost more than 90% of their forest cover. Forest systems are associated with the regulation of 57% of total surface water runoff. On them depends entirely or partially water supply to about 4.6 billion people. Between 1990 and 2000, the total area of temperate forests grew by nearly 3 million hectares per year, at the same time; average deforestation in the tropics in the last two decades has exceeded 12 million hectares a year [2, p.29].

In the modern period of scientific and technical, information development of society, special attention deserves legal protection of natural resources – development of a system of legal rules, norms and measures aimed at preserving the environment, rational use of natural resources, which include forests and forest resources.

The financial and economic mechanism for the rational use and protection of forestland should be based on the implementation of national policy in the field of land relations, which requires comprehensive state support for efficient use of nature through the financing of appropriate organizational measures and the introduction of economic instruments, incentives for rational use of forest resources. The main levers of such a mechanism are fiscal-credit, monetary, budgetary and other elements of influence on economic entities [3].

Analysis of recent researches and publications. Legal aspects of functioning of public utilities and the right of united territorial communities (hereinafter referred to as UTC) in the field of forestry have been highlighted by a team of authors A. Oborska, A. Zhyla, I. Mateiko, T. Zhyla in their scholarly work [4], within the framework of the LEG II project («The European Neighborhood and Partnership Instrument East Countries Forest Law Enforcement and Governance Program»). According to these studies, in Ukraine – 12.95% of forests from the general structure of the forest fund (state ownership) are used by communal forestry enterprises, of which: in Sumska oblast (34.2% – from the total share of communal forests in Ukraine, which is 12.95%); Chernihivska oblast – 32.6%; Vinnytska oblast – 29.8%; Zhytomyrska oblast – 27.2%; Khmelnytska oblast – 25.9%; Lvivska oblast – 21.0%; Ternopilska oblast – 13.5%; Ivano-Frankivska oblast – 13.4%; Cherkaska oblast – 6.5%.

Of particular attention, the issue of legislative fixing of forest land by utility companies, acquires while ensuring the financial independence of territorial communities, considering the fact that forestry enterprises through implementation their forestry function pay their taxes, which are sent to the respective budgets of the administrative-territorial units (state, oblast, rayon / territorial community, villages and settlements). To such the fiscal payments include [4]:

- rent for special use of forest resources (timber from logging) – defined in Article 256 of the current Tax Code of Ukraine, together with that, sizes the rates of rent for special use of forest resources are also determined by the same Article p. 3. This payment is equally distributed equal (50/50%) between state and oblasts budgets;

- rent for special use of forest resources (except wood from logging) – perspective direction of the rules of law for the formation of reserves to local budgets (rent payments from the special use of secondary forest materials – harvesting of hedges, stumps, lubou and bark, wood greens, wood juices according to [5, art. 72]; useful properties of forests – for cultural and recreational, recreational, sporting, tourist and educational purposes and carrying out research works is carried out taking into account the requirements for the conservation of the forest

environment and natural landscapes with observance of the rules of architectural planning of suburban areas and sanitary requirements [5]; side forest uses – hay harvesting, grazing cattle, apiary placement, harvesting wild fruits, nuts, mushrooms, berries, medicinal plants, harvesting forest flooring, reed harvesting [5, art. 73]), however, does not always work perfectly in practice. Appropriate rent are set by oblast councils [5]. Given the indirect data from the Forest Taxation Directory, the proceeds from this tax to local budgets can be significant enough receipts to improve the well-being of the community;

- income tax – the budget to which the tax is levied is determined depending on the local government body to which the municipal forestry company is subordinated [4];
- value added tax (VAT);
- personal income tax – to the UTC budgets, 60% of the personal income tax is credited. Previously, this tax was only credited to the district budget [6];
- land payment – municipal forestry enterprises pay only for non-forested land on which buildings and structures are located [4], since the forest land tax is defined as a component of the rent payment;
- military gathering;
- property tax – paid on a general basis;
- sole tax – paid by business entities that have opted for a simplified tax system.

An interesting analysis on the collection (distribution) of tax payments by communal forestry enterprises is presented in the scientific paper [4] (table 1).

Table 1. List of tax payments of the municipal forestry enterprise *

№	Name of the fiscal payment	Budget level			
		State	Oblast	Rayon (territorial community)	Villages and settlements
		(receipt to the budget from oblast communal enterprises / receipt to the budget from rayon communal enterprises),%			
1	Rent for special use of forest resources (wood from logging)	50/50	50/50	-	-
2	Rent for special use of forest resources (except for wood from logging)	-	-	-	100/100
3	Income tax	-	100/-	-/100	-
4	Value added tax	100/100	-	-	-
5	Personal income tax	25/25	15/15	60/60	-
6	Military gathering	100/100	-	-	-
7	Land payment	-	-	-	100/100
8	Property tax	-	-	-	100/100
9	Sole tax (with a simplified tax system)	-	-	-	100/100

** Note: created by the author's team A. Oborska, A. Zhyla, I. Mateiko, T. Zhyla scientific work [4].*

With the existing regulatory-legal system of regulatory of fiscal payments, the territorial community can fill their own budgets at the expense of municipal forestry enterprises, in the conditions of decentralization of power, by paying rent for special use of forest resources (except for wood from logging), income tax, personal income tax, land payment, property tax, single tax.

Previously unsettled problem constituent. With the tendency of development of territorial communities, regulatory legal support should take into account current views on the development of communal ownership of forestland use and involvement of UTC in direct forest management. These powers will help to shape the financial independence of territorial communities (reserves for improving well-being, community infrastructure), at the expense rents for special use of forests (provision mushrooms, berries, etc.), make monitor compliance with the rules of rational use and protection of forestland (electronic accounting logging wood).

Main purpose of the article. Determining the likely tax revenues to community budgets from the use of forestland by forestry enterprises. To achieve this goal it is necessary to solve a number of problems, namely: to determine the actual area of forestland within the relevant UTC in Ukraine, to determine the possible economic income from the use of these forest areas, to calculate the amount of fiscal revenues to the UTC budgets from forestry enterprises.

Results and discussions. According to the norms of the Budget Code of Ukraine (articles 64, 66, 69) [8] it is advisable to model the conditions of tax revenue, which take into account the use of forest land use by communal (100% of the income on tax of communal property companies (18%) [9, article 136] goes to the ATG budget) [8, article 69, item 1.2] or by private enterprises (60% PIT from income (18%) [9, article 177, 167.1] remains in the budget of UTC) [8, article 64, item 1.1].

To achieve this goal, we performed the following research algorithm:

- preparation of information base with the help of topographic maps, data of space images, on-line resource Open Street Map [7];
- forest digitization and mapping data within Ukraine using geoinformation technologies (ArcGIS software) (fig. 1);
- according to official data, defining the actual boundaries of the UTC [10];
- with the help of ArcGIS software it is necessary to make imposition information layers of data: forest areas of Ukraine, the boundaries of the UTC (fig. 2);
- determination of forest land area using ArcGIS software within Ukraine in the context of UTC (fig. 3);
- creation of a register of data on the accounting of forest lands in the context of the UTC within Ukraine, for further economic and mathematical analysis of the development of the mechanism of rational use and protection of forest land;
- determination of the amount of tax revenues to the budgets of UTC taking into account the rules of the current legislation.

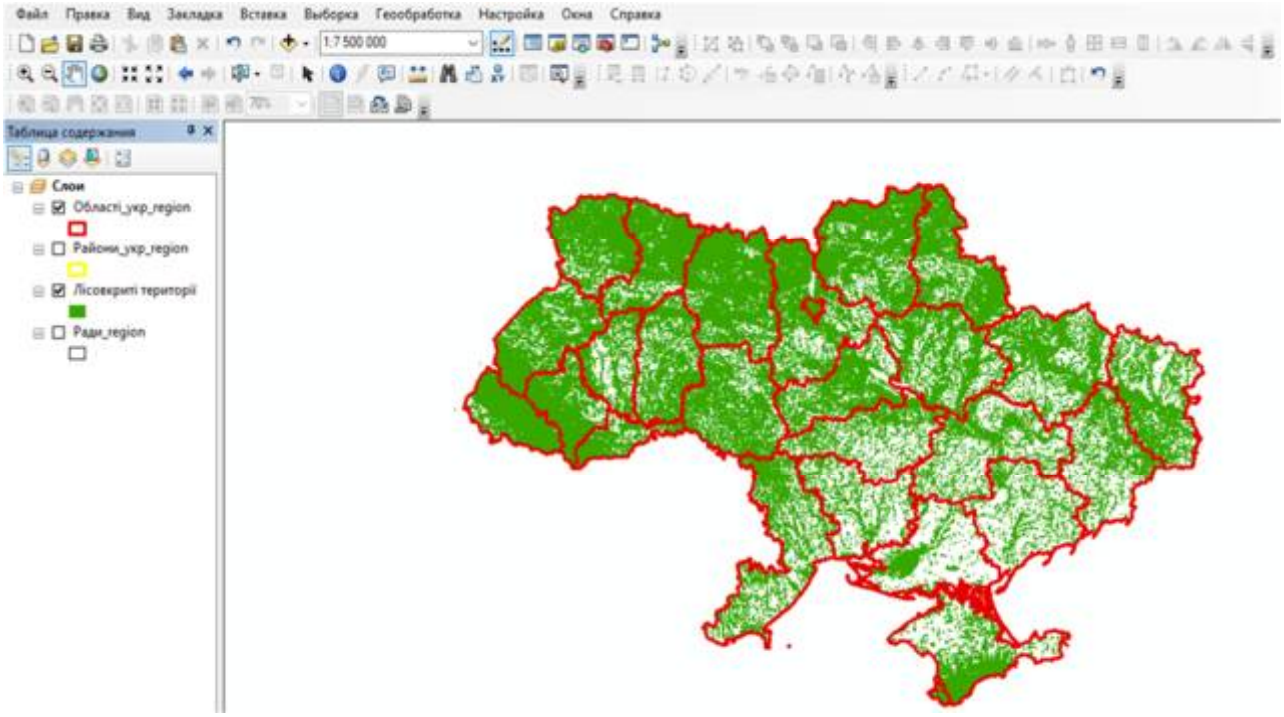

Fig. 1. Digitization of forest territories within Ukraine*

**Note: Created by authors based on topographic maps, space imagery data, Open Street Map [7].*

After performing the action algorithm, described above, we determined the actual forest area within the UTC (936 units – at the time of the 2019 research) located in 452 areas, the manager of these lands is the UTC. The results of the study were grouped by oblast within Ukraine (table 2).

With the help of geoinformation approach, it was established that the largest forest areas in the UTC are concentrated in Zhytomyrska 788.5 thousand hectares), Chernihivska (583.6 thousand hectares), Volynska (432.9 thousand hectares), Rivnenska (282.8 thousand ha), Sumska (216.0 thousand ha) oblasts. Whereas the smallest forest area within the boundaries of the UTC is concentrated in Kirovohradska, Zakarpatska, Mykolaivska, Zaporizka, Vinnytska, Donetska, Luhanska, Odeska, Khersonska oblasts.

The next stage of our study was to determine the total amount of tax revenue in the case of utilization of forested areas within the UTC, for forestry purposes.

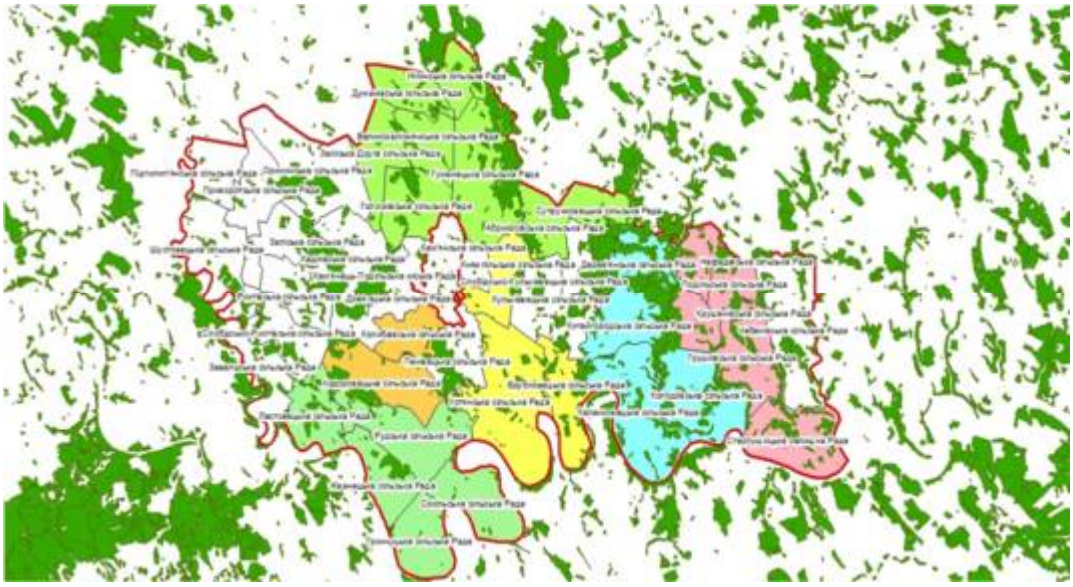

Fig. 2. Impositiong of information layers (boundaries of UTC, forest areas) with the help of ArcGIS software on the example of Kamianets-Podilskyi rayon of Khmelnytska oblast*

**Note: created by the authors.*

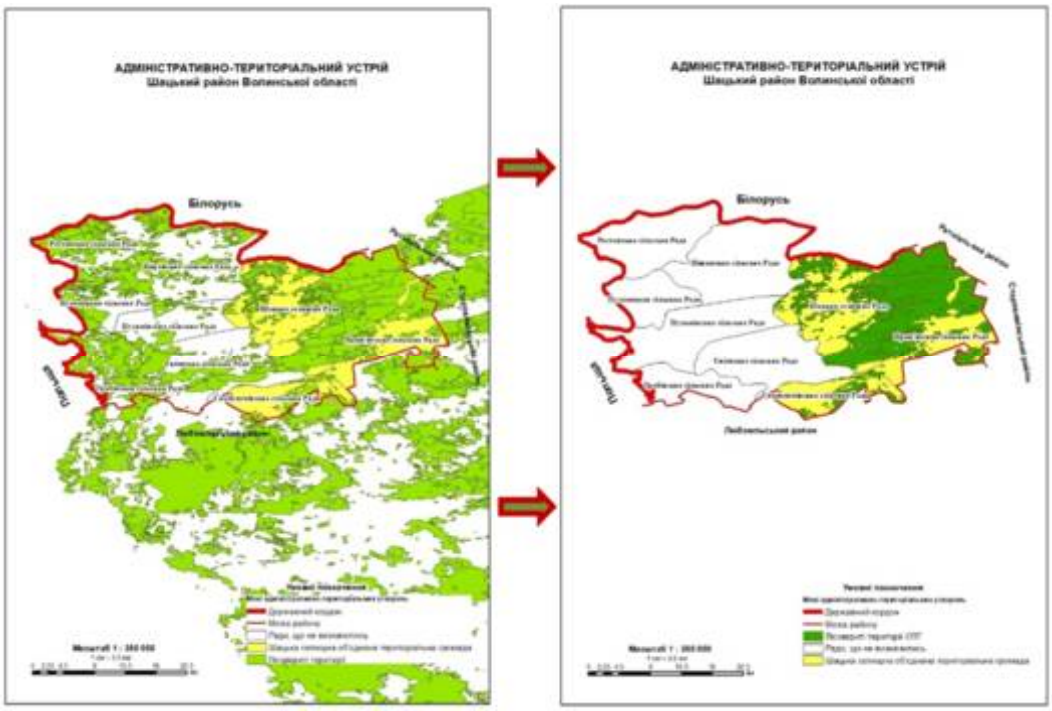

Fig. 3. Geoinformation modeling of forest land use within Ukraine in the context of UTC*

**Note: created by the authors.*

For this purpose, we have determined the indicators of gross income and net profit from the use of forests within the limits of UTC. Such results were obtained by multiplying the total forest area in the UTC by the amount of gross income and net profit from 1 ha of forests in the respective oblast, taking into account the preliminary results on the efficiency of land use by forestry enterprises by section of regions in Ukraine (table 3). The ranked chart presented in (fig. 4) shows that the largest gross income from the utilization of forested areas within the UTC is determined in Kyivska (UAH 1913.05 million), Zhytomyrska(UAH 1116.41 million), Chernihivska (UAH 626.51 million), Volynska (UAH 420.63 million), Khmelnytska (UAH 411.79 million), Rivnenska (UAH 391.40 million), Cherkaska (UAH 356.82 million), Sumska (UAH 299.04 million), Chernivetska (262, 40 million UAH) oblasts.

Table 2. The results of the digitization of forest areas within the UTC based on the geospatial approach in Ukraine*

The name of the oblast	Area of UTC in the administrative-territorial unit, ha	Forest area within the UTC (defined by the author), ha	Number of settlements (UTC), pcs.
Vinnytska	441362,20	62356,30	43
Volynska	1118521,80	432866,10	51
Dnipropetrovska	1812730,30	99984,00	63
Donetska	683792,60	65172,20	17
Zhytomyrska	2005922,50	788455,80	57
Zakarpatska	65073,00	38964,10	7
Zaporizka	1708381,10	56303,20	55
Ivano-Frankivska	385917,40	167615,20	35
Kyivska	531321,70	98941,40	27
Kirovohradska	497269,10	30426,20	21
Luhanska	873727,20	67320,70	22
Lvivska	492385,50	133339,50	40
Mykolaivska	1148706,70	50867,80	41
Odeska	975047,90	85292,50	33
Poltavska	934856,90	135738,00	50
Rivnenska	728415,00	282754,90	42
Sumska	994966,90	216016,60	37
Ternopilska	679474,60	103129,90	52
Kharkivska	650649,30	92234,20	19
Khersonska	933175,50	92062,30	34
Khmelnytska	1216576,60	194477,80	48
Cherkaska	836350,90	163491,80	57
Chernivetska	372613,20	134324,40	36
Chernihivska	1947808,10	583583,20	49

** Note: calculated by the authors without taking into account the temporarily occupied territories of the Avtonomna Respublika Krym, Sevastopol and parts of the temporarily occupied territories of Luhanska and Donetska oblasts.*

Table 3. Productivity of forest area utilization in UTC*

The name of the oblast	Area of UTC in the administrative-territorial unit, ha	Forest area within the UTC (defined by the author), ha	Revenue from the use of forested areas in UTC, thousand UAH [13]	Profit from the use of forested areas in UTC, thousand UAH
Vinnytska	441362,20	62356,30	96767,02	**2378,29**
Volynska	1118521,80	432866,10	420628,96	*-40745,63*
Dnipropetrovska	1812730,30	99984,00	15877,45	*-12996,92*
Donetska	683792,60	65172,20	7718,33	*-2625,79*
Zhytomyrska	2005922,50	788455,80	1116406,10	**100780,43**
Zakarpatska	65073,00	38964,10	4077,98	*-3167,39*
Zaporizka	1708381,10	56303,20	5892,68	*-4576,93*
Ivano-Frankivska	385917,40	167615,20	187956,99	**15791,01**
Kyivska	531321,70	98941,40	1913053,74	**124611,73**
Kirovohradska	497269,10	30426,20	31935,97	**1273,34**
Luhanska	873727,20	67320,70	14806,50	*-2404,69*
Lvivska	492385,50	133339,50	127409,87	*-5364,28*
Mykolaivska	1148706,70	50867,80	6610,80	*-5669,2*
Odeska	975047,90	85292,50	20151,20	*-6137,66*
Poltavska	934856,90	135738,00	118632,28	**4157,63**
Rivnenska	728415,00	282754,90	391397,81	**40662,99**
Sumska	994966,90	216016,60	299036,09	**8253,99**
Ternopilska	679474,60	103129,90	119672,99	**23171,21**
Kharkivska	650649,30	92234,20	54103,66	*-5363,43*
Khersonska	933175,50	92062,30	11333,80	*-15059,54*
Khmelnytska	1216576,60	194477,80	411785,37	**54747,44**
Cherkaska	836350,90	163491,80	356815,98	**78786,66**
Chernivetska	372613,20	134324,40	262402,70	**32776,51**
Chernihivska	1947808,10	583583,20	626511,59	**65588,94**

**Note: created by the authors.*

The ranked chart presented in (Fig. 4) shows that the largest gross income from the utilization of forested areas within the UTC is determined in Kyivska (UAH 1913.05 million), Zhytomyrska (UAH 1116.41 million), Chernihivska (UAH 626.51 million), Volynska (UAH 420.63 million), Khmelnytska (UAH 411.79 million), Rivnenska (UAH 391.40 million), Cherkaska (UAH 356.82 million), Sumska (UAH 299.04 million), Chernivetska (UAH 262.40 million) oblasts. At the same time, the total area of forests within the UTC has a weak mathematical relationship between the amount of income from the use of these lands, a correlation coefficient of 0.49 confirms this. The main lever of influence on the amount of gross income from the use of forestland, in our opinion, is the application of modern, efficient technologies at all stages of forestry.

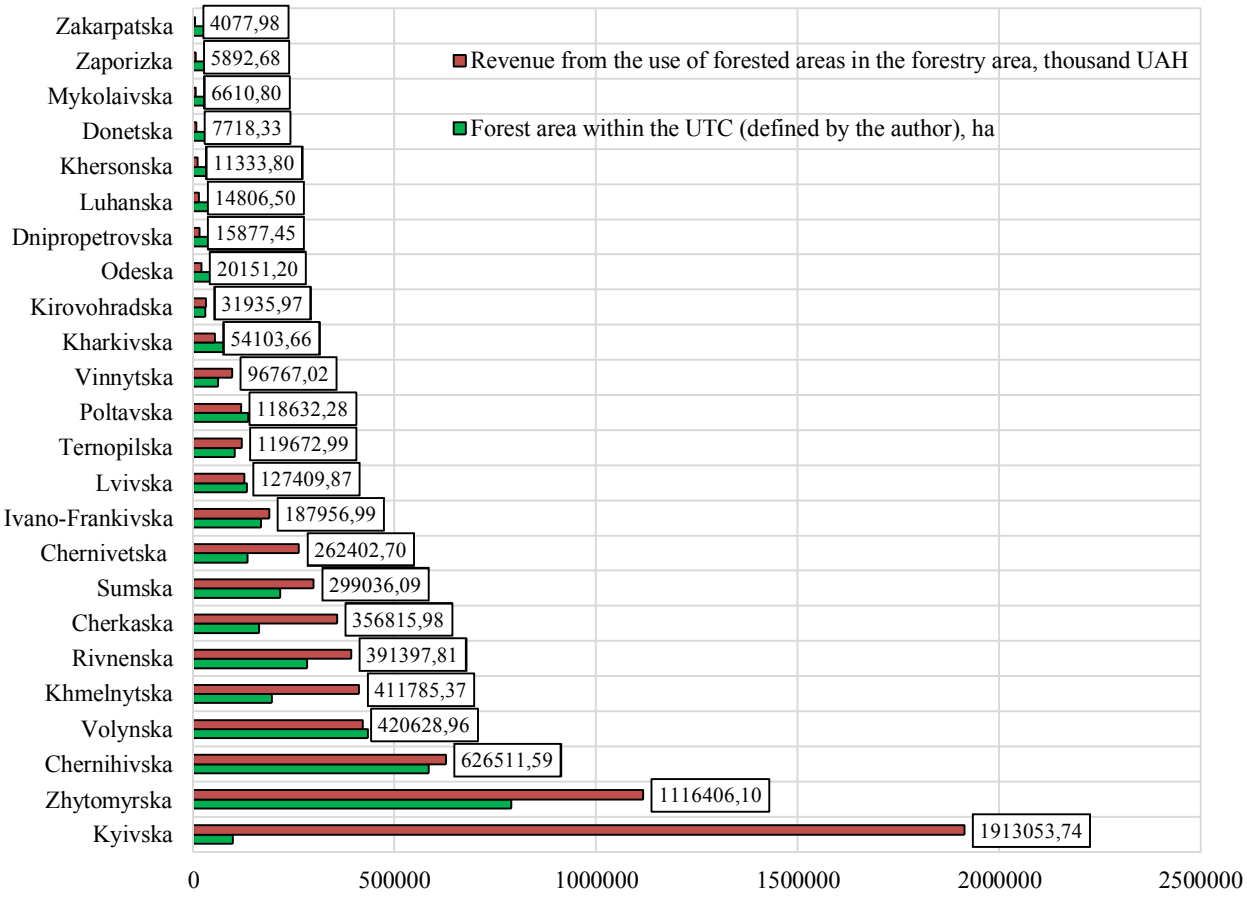

Fig. 4. Diagram of the gross income from the use of forest area within the UTC*

**Note: calculated and created by the authors.*

The lowest indicators of gross income from the utilization of forested areas within the UTC are concentrated in Vinnytska (UAH 96.77 million), Kharkivska (UAH 54.10 million), Kirovohradska (UAH 31.94 million), Odeska (UAH 20.15 million), Dnipropetrovska (UAH 15.88 million), Luhanska (UAH 14.81 million), Khersonska (UAH 11.33 million), Mykolaivska (UAH 6.61 million), Zaporizka (UAH 5.89 million), Zakarpatska (UAH 4.08 million) oblasts.

Based on gross income and revenue from the utilization of forested areas in the UTC, we have estimated probable tax revenues, including to the UTC budgets, in accordance with the law in force, on the share of tax distribution between local and state budgets (table 4) [8, 9].

According to Article 64.1.1 of the Budget Code of Ukraine [8], 60% of PIT – 18% of gross income [9, article 177, 167.1] remains in the budget of the UTC. In view of this provision, we determined the total amount of likely fiscal revenues to local budgets from income from forestry utilization of forested areas within the UTC (fig. 5).

Table 4. Calculation of the amount of fiscal revenues from the use of forested areas within the UTC to local budgets*

The name of the oblast	Tax revenues from forestry revenues (18% × income = 100% – total PIT), thousand UAH	Tax revenues to local budgets from forestry revenues (60% of PIT – in terms of financial decentralization), thousand UAH	Tax receipts to local budgets from profit from forestry use (under conditions of financial decentralization – 100% tax on profit of enterprises of communal property = 18% × profit), thousand UAH
Vinnytska	17418,06	10450,84	428,09
Volynska	75713,21	45427,93	*The use of forests is not profitable*
Dnipropetrovska	2857,92	1714,75	*The use of forests is not profitable*
Donetska	1389,31	833,59	*The use of forests is not profitable*
Zhytomyrska	200953,1	120571,86	18140,48
Zakarpatska	734,03	440,42	*The use of forests is not profitable*
Zaporizka	1060,73	636,44	*The use of forests is not profitable*
Ivano-Frankivska	33832,24	20299,34	2842,38
Kyivska	344349,68	206609,81	22430,11
Kirovohradska	5748,5	3449,1	229,2
Luhanska	2665,19	1599,11	*The use of forests is not profitable*
Lvivska	22933,78	13760,27	*The use of forests is not profitable*
Mykolaivska	1189,94	713,96	*The use of forests is not profitable*
Odeska	3627,23	2176,34	*The use of forests is not profitable*
Poltavska	21353,8	12812,28	748,37
Rivnenska	70451,63	42270,98	7319,34
Sumska	53826,49	32295,89	1485,72
Ternopilska	21541,13	12924,68	4170,82
Kharkivska	9738,68	5843,21	*The use of forests is not profitable*
Khersonska	2040,09	1224,05	*The use of forests is not profitable*
Khmelnytska	74121,38	44472,83	9854,54
Cherkaska	64226,9	38536,14	14181,6
Chernivetska	47232,48	28339,49	5899,77
Chernihivska	112772,09	67663,25	11806,01

**Note: created by the authors.*

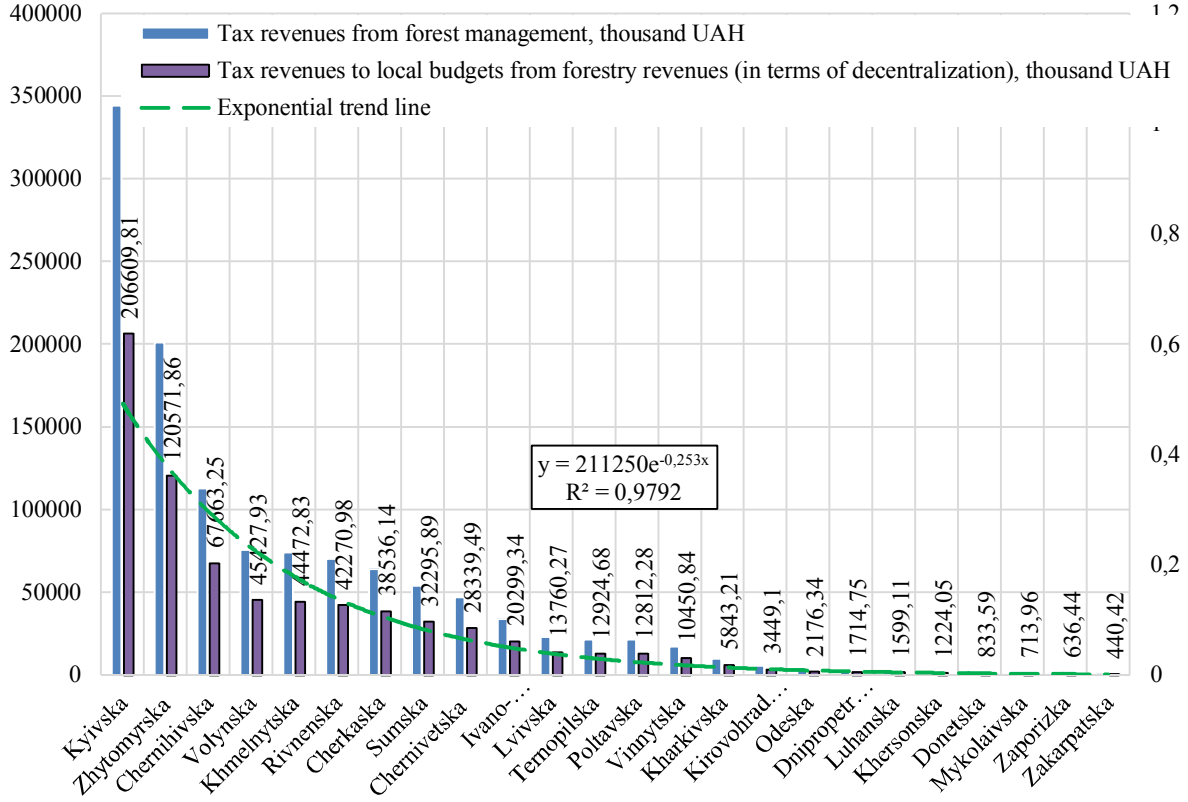

Fig. 5. Diagram of tax revenues from revenues from the use of forest area within the UTC*

**Note: calculated and created by the authors.*

Together with that, in the case of utilization of forested areas within the boundaries of the UTC by utility enterprises, who, under applicable law, pay 18% [9, article 136] of the corporate income tax of communal property, which is fully coming to the UTC budget, we have calculated such fiscal revenues by oblasts where forestry is profitable, in particular: Kyivska, Zhytomyrska, Cherkaska, Chernihivska, Khmelnytska, Rivnenska, Chernivetska, Ternopilska, Ivano-Frankivska, Sumska, Poltavska, Vinnytska, Kirovohradska (fig. 6).

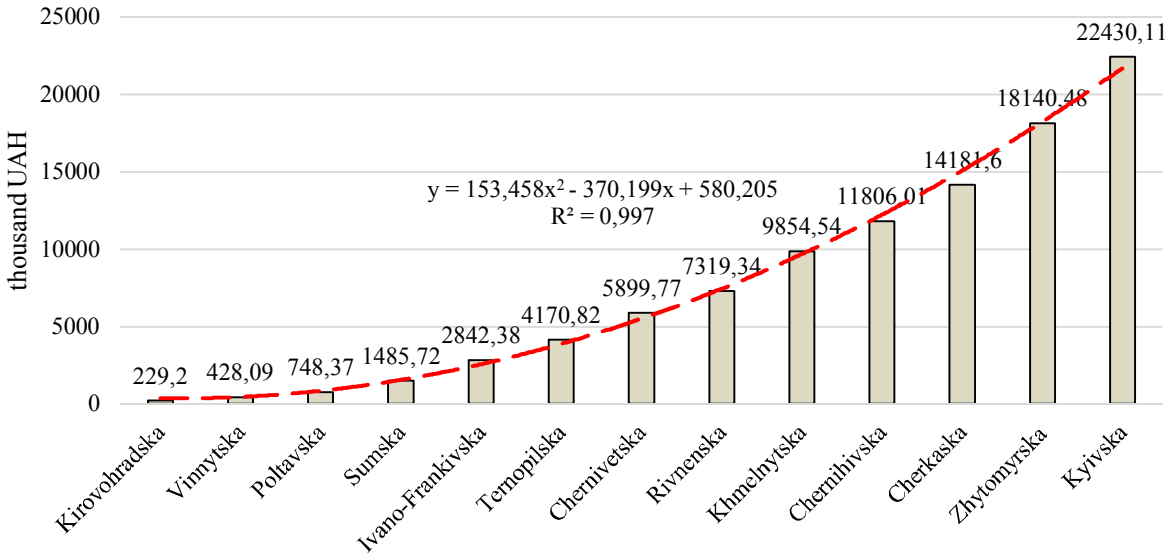

Fig. 6. Diagram of fiscal from the profits of public utilities from the use of forested areas within the UTC*

**Note: calculated and created by the authors.*

In this way, we calculated different conditions for tax revenues to UTC budgets because of to the use of forestland within the UTC, who are directly under the jurisdiction of the community. At the same time, according to the indicator of the amount of fiscal revenues to local budgets from forestry per resident of UTC, the leading positions are occupied by such areas as Cherkaska (113.10 UAH / person), Volynska (123.40 UAH / person), Rivnenska (129.40 UAH / person), Chernihivska (135.65 UAH / person), Zhytomyrska (144.61 UAH / person), Kyivska (548.07 UAH / person) [14 – 17] (fig. 7).

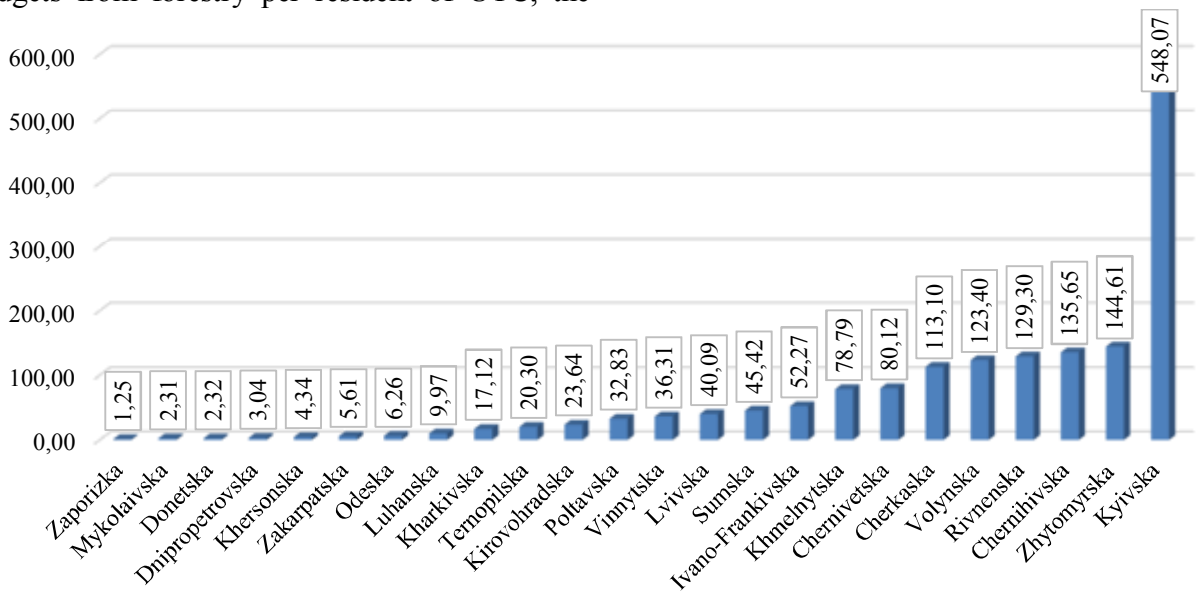

Fig. 7. Diagram of fiscal revenues to local budgets from forest use per resident of UTC, UAH / person *

**Note: calculated and created by the authors.*

Conclusions. Therefore, we have proposed a scientific approach to developing a financial and economic mechanism for regulating the rational use of forest land, should be based on the totality of financial and economic relations between forest resources and business entities, based on the application of the geospatial approach of forest area accounting, as an integral part of information support for the effective functioning of the economic system as a whole.

On the whole, due to the proposed financial and economic mechanism, the total amount of tax revenues to the UTC budgets in Ukraine may be increased by UAH 715.1 million, which is about 10.2% of actual revenues from UTC resources in Ukraine for 2015 – 2016 (UAH 7005.2 million) [11, supplement. E] or 6.01% of the total taxes on individuals' income to the UTC budgets in 2018 (PIT for the UTC budgets in Ukraine – UAH 11880.3 million) [12], at the same time, the forest area within the UTC at the national level as of 2019 is only 18.95%.

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